

# 2010-11-23 Tuesday Morning Notes

Tuesday, November 23, 2010  
7:36 AM

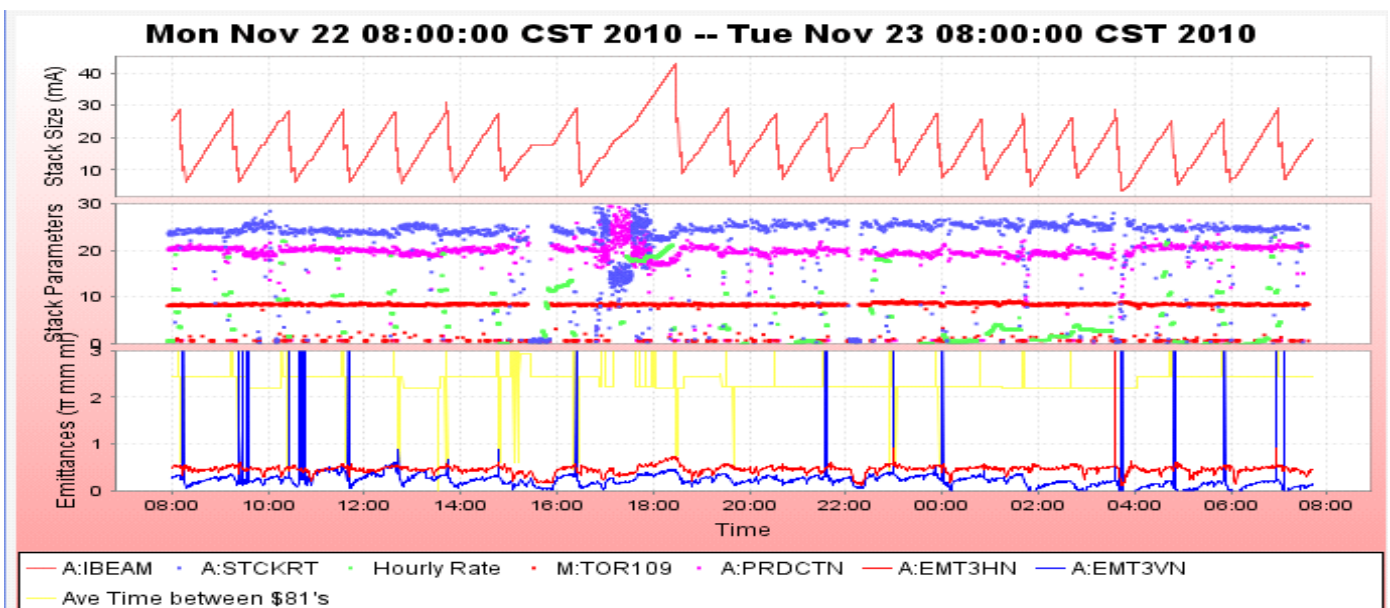
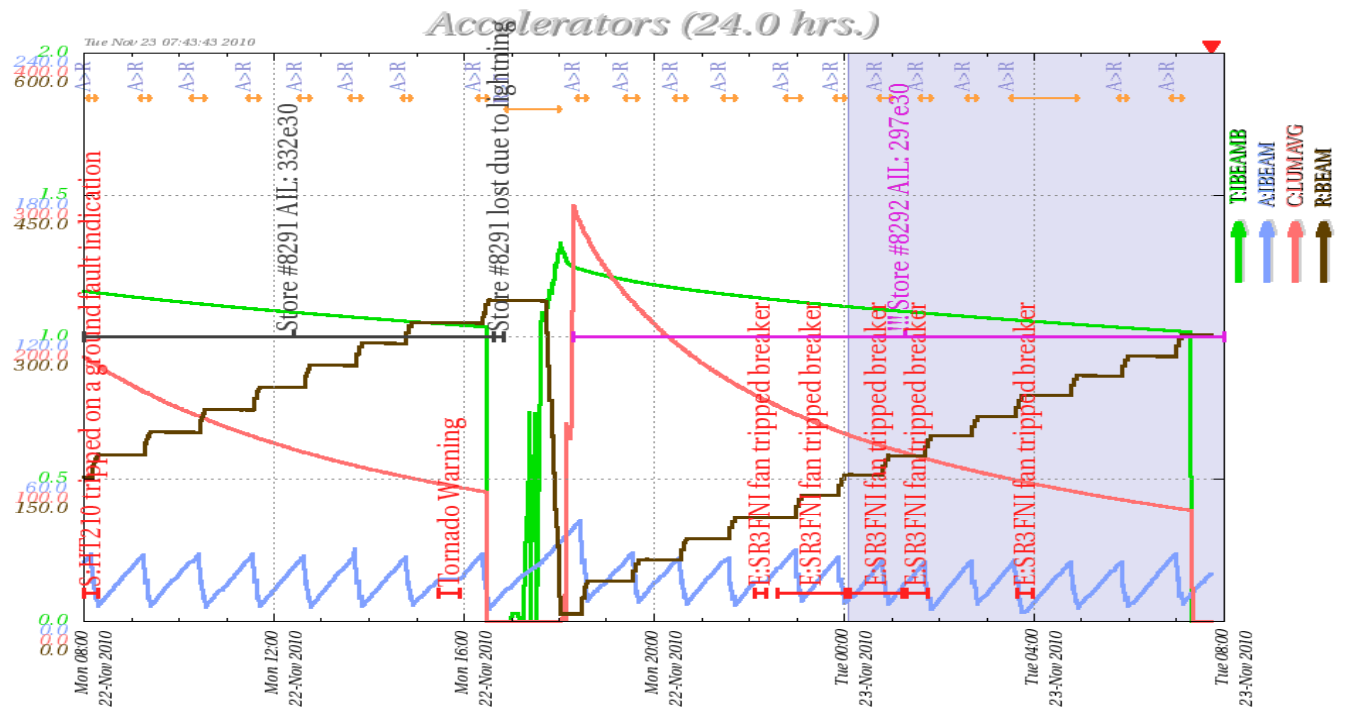
## Stacking and Transfers

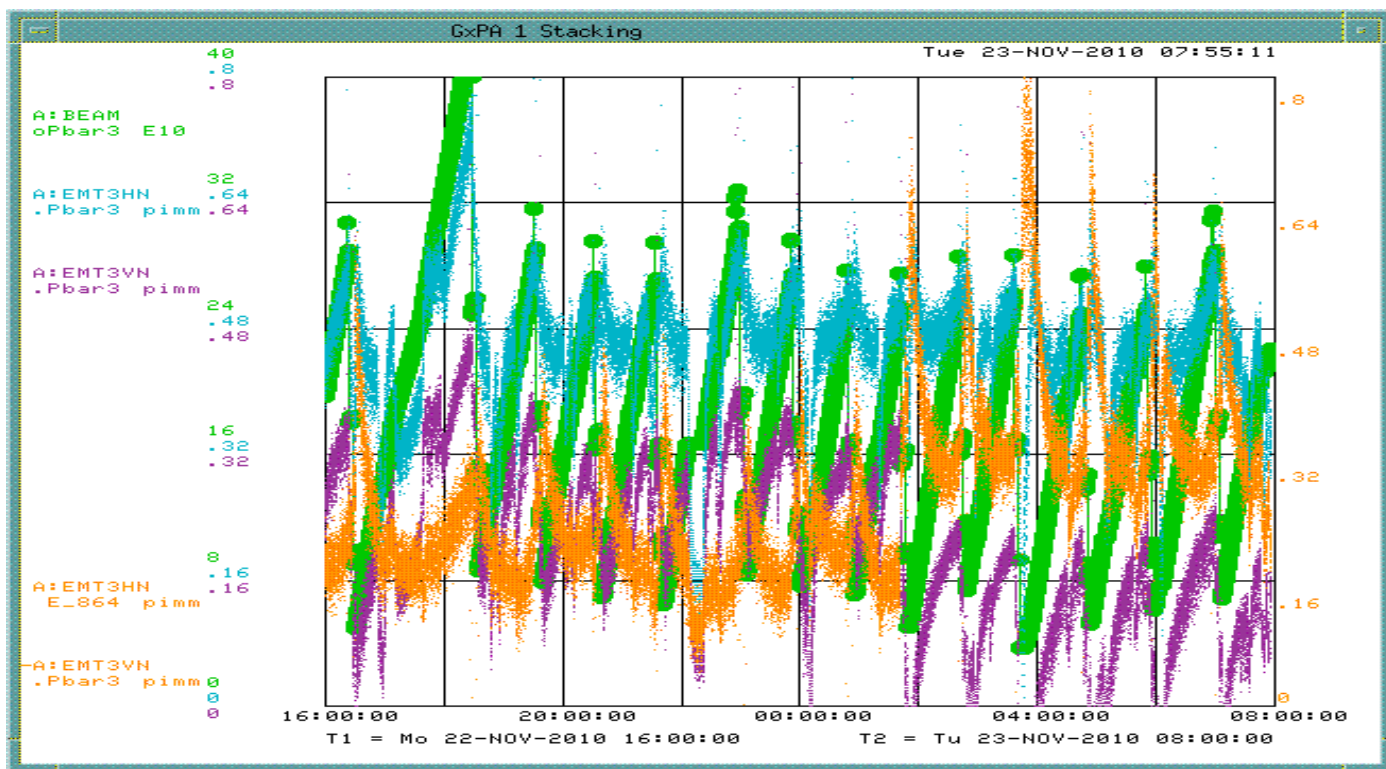
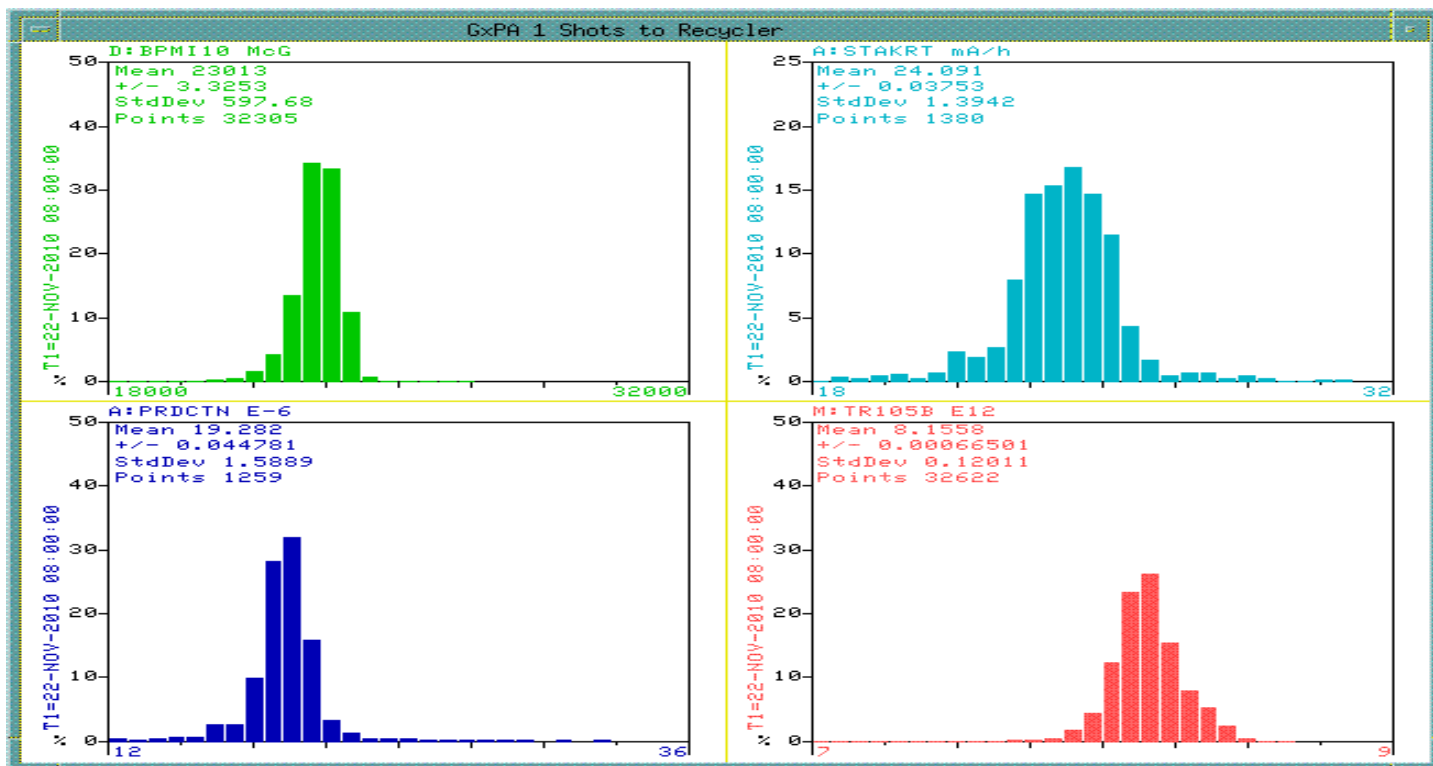
- Noticed unexplainable changes in the Debuncher momentum band 3 power
- Noticed Debuncher momentum/horizontal kicker motion control D:MV201D is showing spontaneous changes in its readback with no settings being sent.
- Stacked 24.1mA/hr with a production of 19.3 pbar/Mp with 8.16 Tp on target.
- Unstacked 508E10 pbars in 63 transfers over 21 sets with an average efficiency of 96.9%

## Numbers

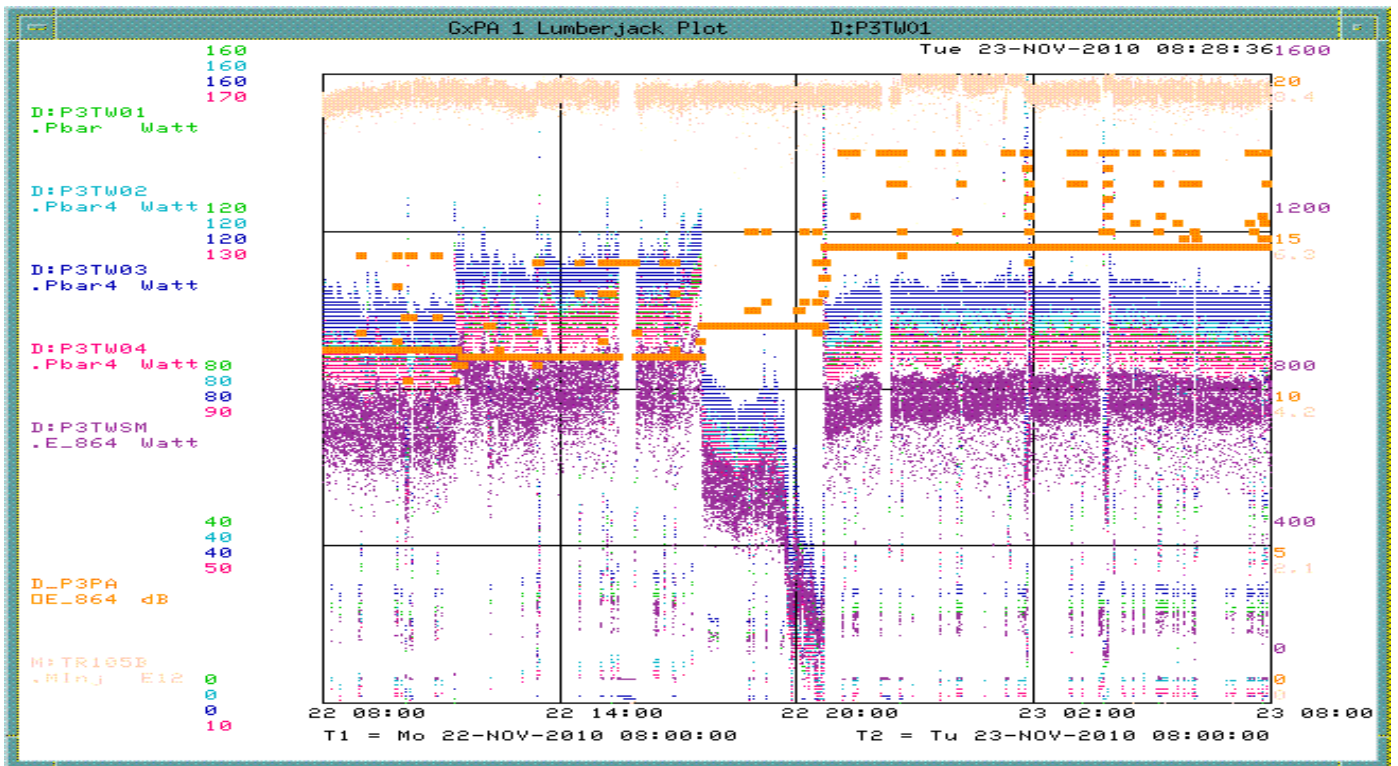
- Stacking
  - Pbars stacked: 522.87 E10
  - Time stacking: 23.78 Hr
  - Average stacking rate: 21.99 E10/Hr
- Uptime
  - Number of pulses while in stacking mode: 35662
  - Number of pulses with beam: 32567
  - Fraction of up pulses was: 91.32%
- The uptime's effect on the stacking numbers
  - Corrected time stacking: 21.72 Hr
  - Possible average stacking rate: 24.07 E10/Hr
  - Could have stacked: 572.57 E10/Hr
- Recycler Transfers
  - Pbars sent to the Recycler: 498.03 E10
  - Number of transfers : 62
  - Number of transfer sets: 21
  - Average Number of transfer per set: 2.95
  - Time taken to shoot including reverse proton tuneup: 00.22 Hr
  - Transfer efficiency: 96.66%
- Other Info
  - Average POT : 8.15 E12
  - Average production: 19.70 pbars/E6 protons

## Plots

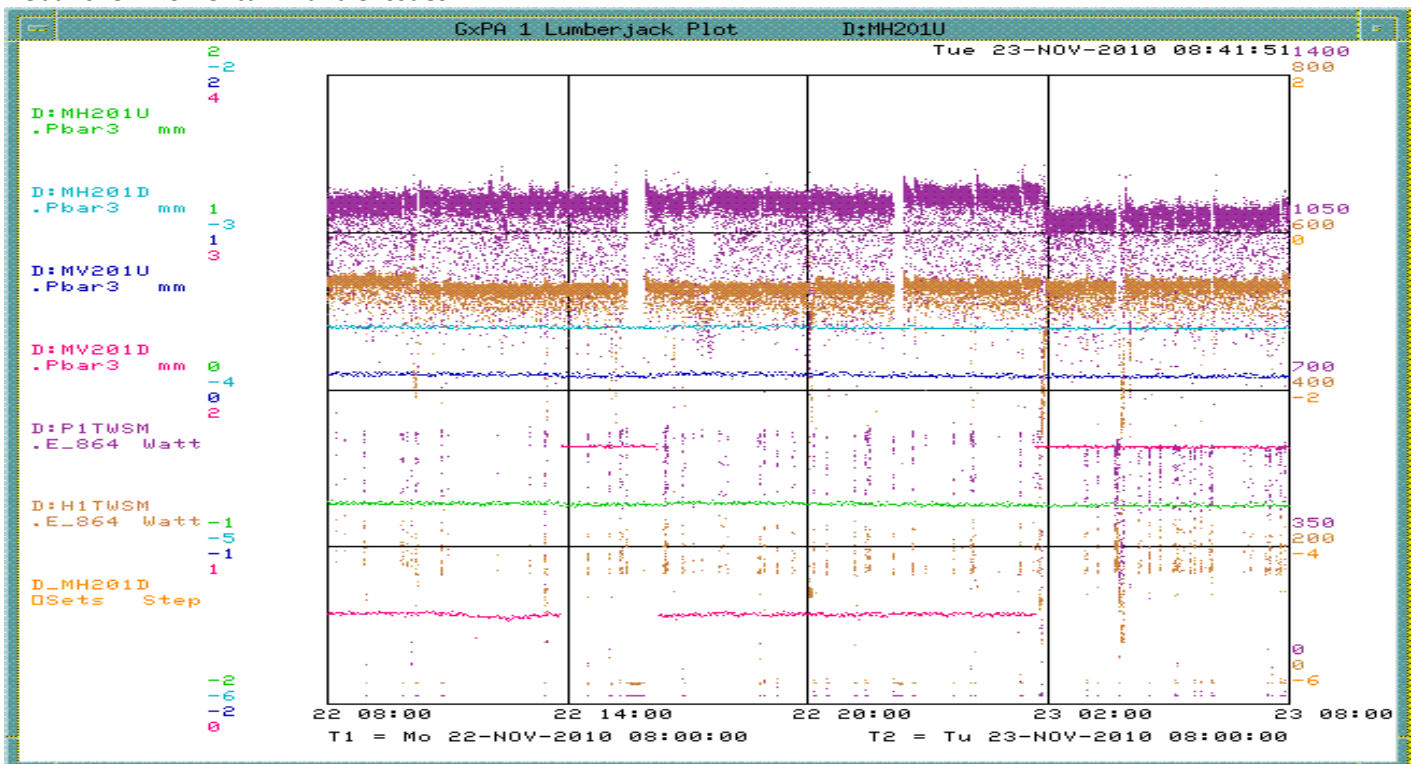




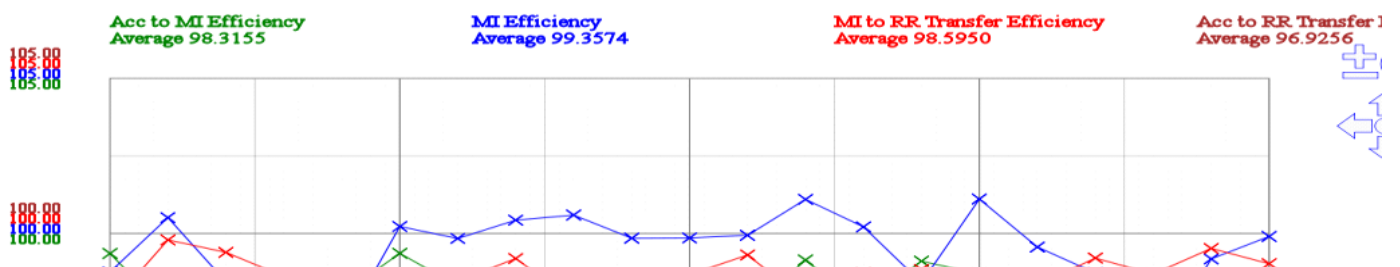
Vertical emittance monitor took another step downward

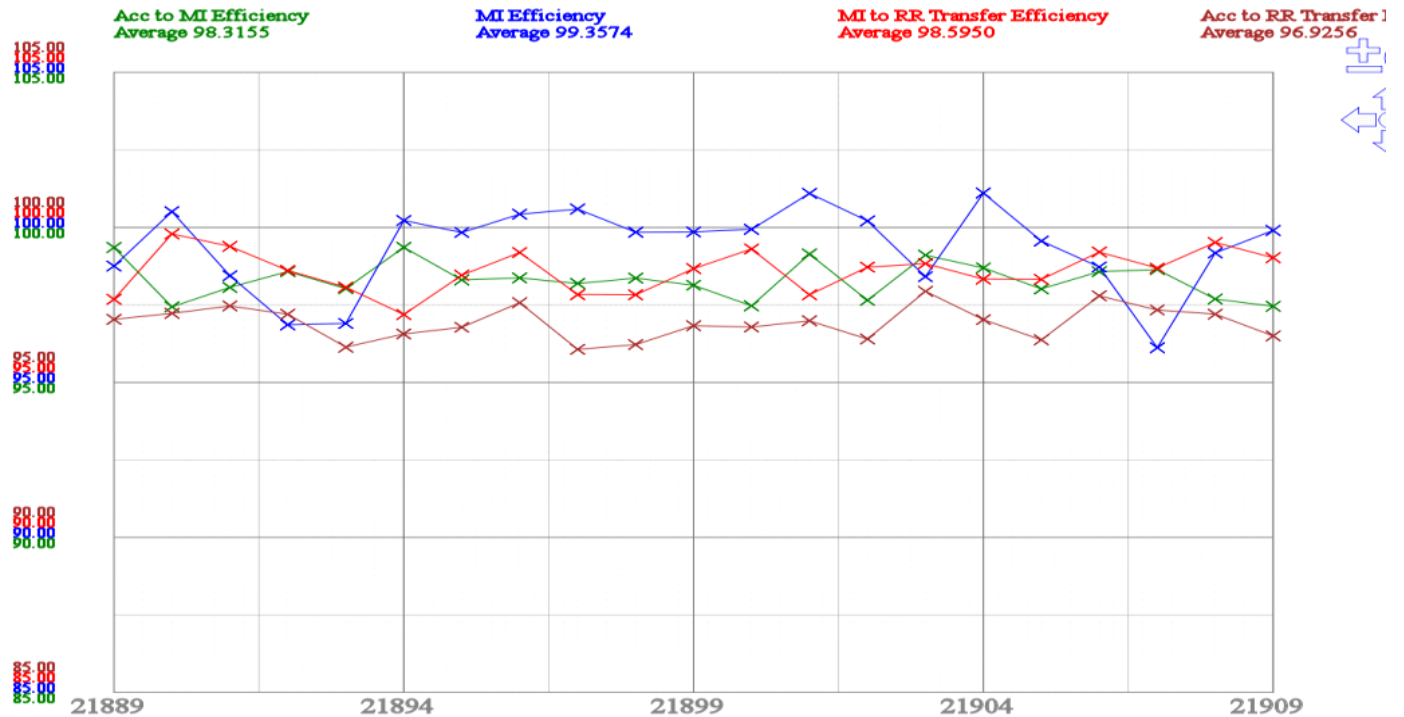


Debuncher Momentum Band 3 issues



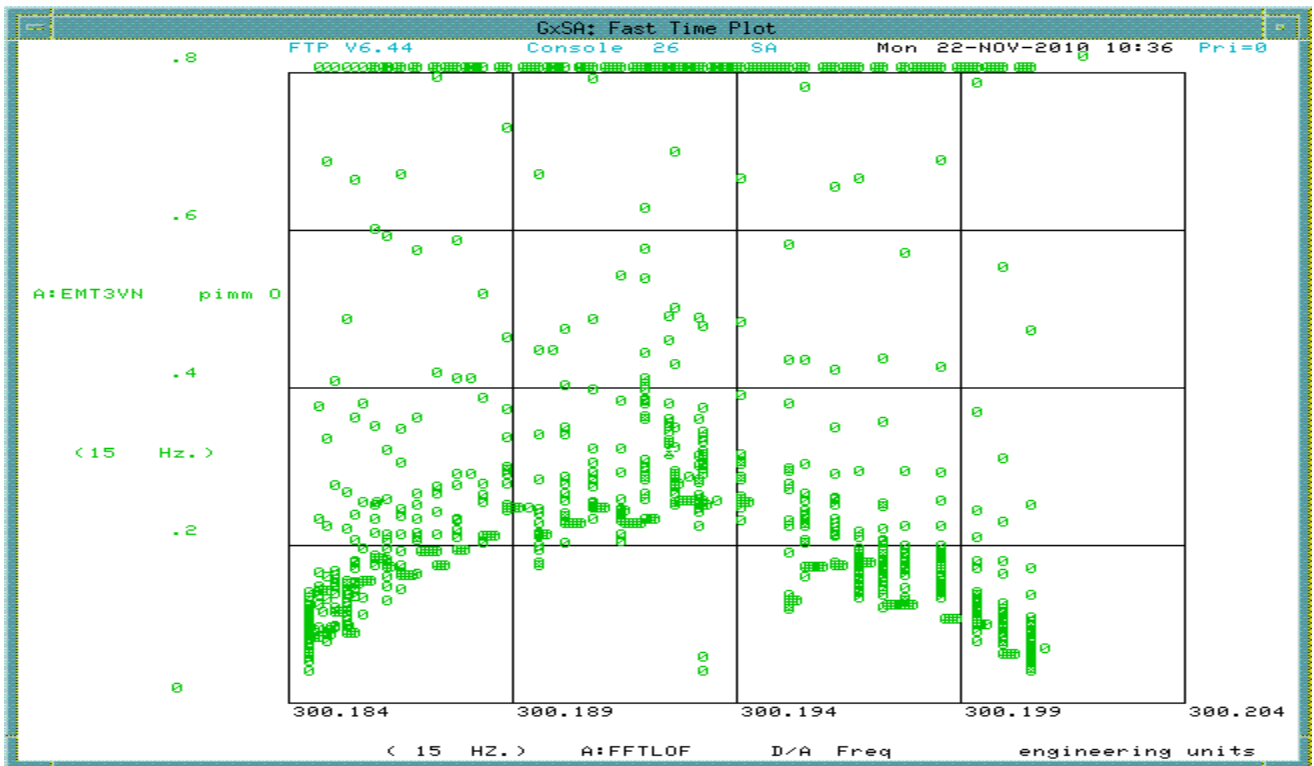
Debuncher horizontal/momentum band 1 motion control shows steps in the readback on the downstream end.



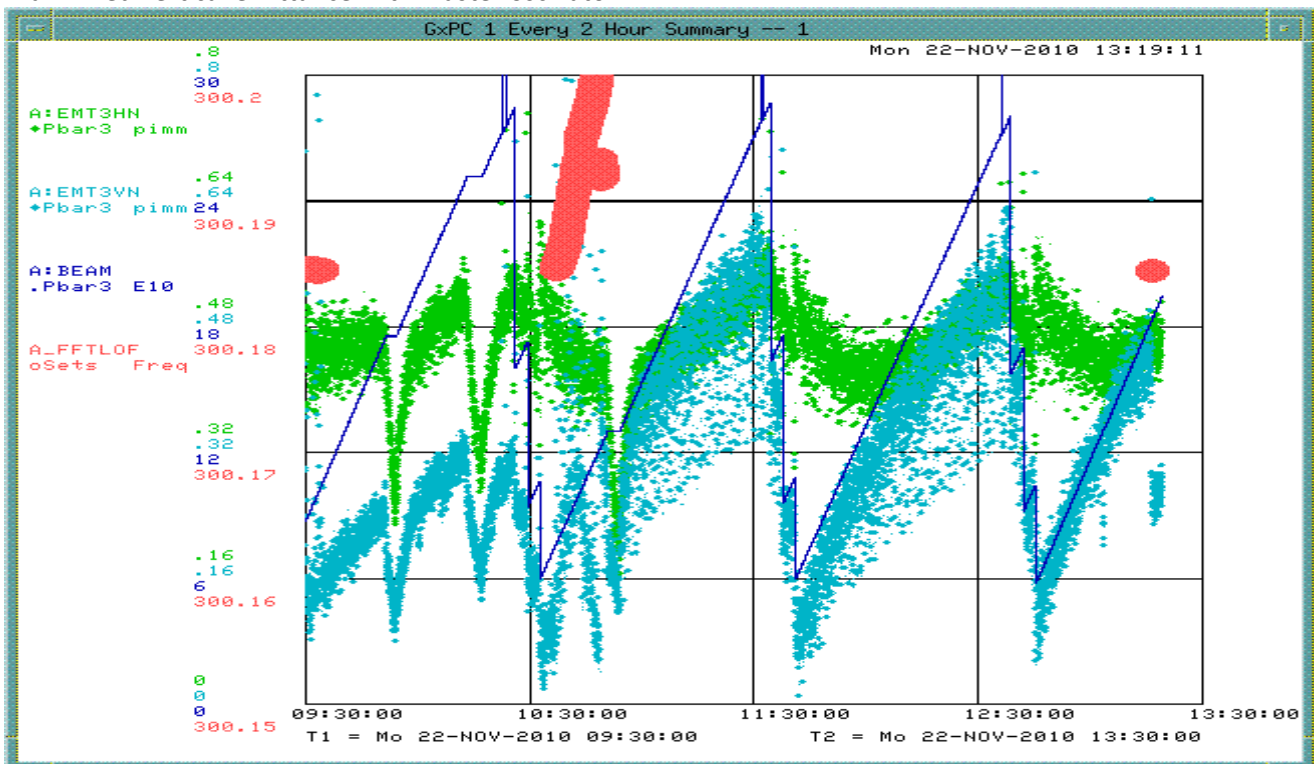


| Column 1<br>Number<br>_0_Pbar<br>Transfer Shot # | Column 4 Number_3_Transfer Time |       | Column 21<br>Number<br>_20_A-I<br>BEAMB<br>sampled<br>on \$91<br>(A:BEA<br>M7),<br>E10 | Column 22<br>Number<br>_21_A-I<br>BEAMB<br>sampled<br>on \$94<br>(A:BEA<br>M9),<br>E10 | Unstacked<br>(mA) | Column 23<br>Number<br>_22_R:<br>BEAMS<br>(R:BEA<br>ME0[0])<br>pre sfer<br>E10 | Column 24<br>Number<br>_23_R:<br>BEAM<br>(R:BEA<br>ME0[1])<br>post sfer, E10 | Stashed | Acc to<br>RR Eff | Acc to MI<br>Eff | Acc to<br>MI2 Eff | Acc to MI<br>* Acc to<br>MI2<br>Efficiency | Trans<br>fers | Sets | Column 5<br>Number<br>_4_Acc<br>Horizontal<br>Emittance | Column 6<br>Number<br>_5_Acc<br>Vertical<br>Emittance | Column 8<br>Number<br>_7_Acc<br>Longitudinal<br>Emittance |
|--|---------------------------------|-------|--|--|-------------------|--|--|---------|------------------|------------------|-------------------|--|---------------|------|---|---|---|
|  | Totals =>                       |       |  |  | 508.32            |  |  | 492.41  | 96.87%           | 98.36%           | 97.77%            | 96.17%                                     | 63            | 21   | 4.6375  | 2.2446  | 1.9926  |
|  | Daily Average =>                |       |  |  | 508.32            |  |  | 492.41  |                  |                  |                   |  | 63            | 21   |   |   |   |
| 21909  | Tuesday, November 23, 2010      | 6:59  | 29.04  | 6.95   | 24.41             | 279.63   | 303.03   | 23.55   | 96.47%           | 97.53%           | 97.32%            | 94.91%                                     | 3             | 1    | 4.894   | 1.43  | 1.99  |
| 21908  | Tuesday, November 23, 2010      | 5:50  | 25.51  | 6.20   | 21.84             | 259.24   | 280.19   | 21.17   | 96.95%           | 98.02%           | 97.41%            | 95.48%                                     | 3             | 1    | 4.486   | 1.367   | 2.024   |
| 21907  | Tuesday, November 23, 2010      | 4:46  | 25.05  | 5.33   | 22.09             | 238.42   | 259.73   | 21.43   | 97.02%           | 98.34%           | 95.88%            | 94.29%                                     | 3             | 1    | 4.282   | 0.608   | 1.969   |
| 21906  | Tuesday, November 23, 2010      | 3:36  | 26.27  | 3.78   | 23.28             | 216.20   | 238.75   | 22.75   | 97.71%           | 98.55%           | 97.53%            | 96.12%                                     | 3             | 1    | 3.467   | 0.581   | 1.952   |
| 21905  | Tuesday, November 23, 2010      | 2:41  | 26.10  | 7.37   | 21.22             | 196.16   | 216.54   | 20.51   | 96.67%           | 98.21%           | 97.68%            | 95.93%                                     | 3             | 1    | 4.866   | 1.32  | 2.032   |
| 21904  | Tuesday, November 23, 2010      | 1:42  | 25.50  | 5.05   | 22.11             | 175.07   | 196.42   | 21.43   | 96.89%           | 99.05%           | 99.08%            | 98.14%                                     | 3             | 1    | 4.198   | 1.279   | 1.987   |
| 21903  | Tuesday, November 23, 2010      | 0:48  | 25.64  | 7.15   | 21.13             | 154.75   | 175.32   | 20.71   | 97.99%           | 98.88%           | 97.69%            | 96.60%                                     | 3             | 1    | 4.581   | 2.788   | 2.036   |
| 21902  | Monday, November 22, 2010       | 23:53 | 27.56  | 7.63   | 22.56             | 133.39   | 155.00   | 21.78   | 96.55%           | 97.84%           | 97.60%            | 95.49%                                     | 3             | 1    | 4.898   | 2.562   | 2.032   |
| 21901  | Monday, November 22, 2010       | 22:58 | 30.58  | 8.38   | 24.87             | 109.72   | 133.61   | 24.08   | 96.86%           | 99.00%           | 100.27%           | 99.26%                                     | 3             | 1    | 4.985   | 3.1   | 2.031   |
| 21900  | Monday, November 22, 2010       | 21:35 | 27.32  | 6.54   | 23.43             | 87.34  | 109.90   | 22.70   | 96.88%           | 97.80%           | 97.62%            | 95.47%                                     | 3             | 1    | 4.533   | 2.827   | 1.997   |
| 21899  | Monday, November 22, 2010       | 20:33 | 27.37  | 7.02   | 22.97             | 65.34  | 87.43  | 22.23   | 96.78%           | 98.07%           | 97.73%            | 95.84%                                     | 3             | 1    | 4.293   | 2.424   | 2.015   |
| 21898  | Monday, November 22, 2010       | 19:32 | 29.23  | 7.93   | 23.85             | 42.56  | 65.48  | 22.92   | 96.13%           | 98.54%           | 98.47%            | 97.04%                                     | 3             | 1    | 4.678   | 2.426   | 2.017   |
| 21897  | Monday, November 22, 2010       | 18:28 | 43.15  | 8.66   | 36.74             | 7.99   | 42.68  | 35.10   | 95.53%           | 98.14%           | 98.00%            | 96.18%                                     | 3             | 1    | 5.687   | 3.286   | 1.915   |
| 21896  | Monday, November 22, 2010       | 16:23 | 29.04  | 5.05   | 25.35             | 314.91   | 339.37   | 24.75   | 97.61%           | 98.49%           | 98.50%            | 97.01%                                     | 3             | 1    | 4.369   | 2.162   | 1.916   |
| 21895  | Monday, November 22, 2010       | 14:47 | 27.40  | 6.53   | 23.32             | 293.36   | 315.90   | 22.63   | 97.02%           | 98.24%           | 97.69%            | 95.97%                                     | 3             | 1    | 4.723   | 2.466   | 2.014   |
| 21894  | Monday, November 22, 2010       | 13:43 | 28.51  | 6.06   | 24.82             | 270.20   | 294.03   | 23.94   | 96.46%           | 99.38%           | 99.80%            | 99.18%                                     | 3             | 1    | 4.614   | 2.164   | 1.993   |
| 21893  | Monday, November 22, 2010       | 12:38 | 28.11  | 5.88   | 24.60             | 246.99   | 270.64   | 23.73   | 96.45%           | 98.28%           | 95.66%            | 94.02%                                     | 3             | 1    | 4.715   | 3.715   | 1.979   |
| 21892  | Monday, November 22, 2010       | 11:34 | 28.73  | 6.07   | 25.03             | 223.30   | 247.46   | 24.37   | 97.37%           | 98.68%           | 95.98%            | 94.72%                                     | 3             | 1    | 4.76  | 3.434   | 1.987   |
| 21891  | Monday, November 22, 2010       | 10:25 | 28.50  | 6.06   | 24.86             | 199.69   | 223.72   | 24.22   | 97.45%           | 98.17%           | 96.96%            | 95.18%                                     | 3             | 1    | 4.592   | 2.365   | 1.982   |
| 21890  | Monday, November 22, 2010       | 9:16  | 28.73  | 6.16   | 24.92             | 176.00   | 200.13   | 24.25   | 97.28%           | 97.51%           | 98.00%            | 95.56%                                     | 3             | 1    | 5.088   | 2.461   | 1.981   |
| 21889  | Monday, November 22, 2010       | 8:09  | 28.81  | 6.17   | 24.93             | 152.34   | 176.34   | 24.18   | 96.97%           | 99.03%           | 97.94%            | 97.00%                                     | 3             | 1    | 4.678   | 2.371   | 1.995   |

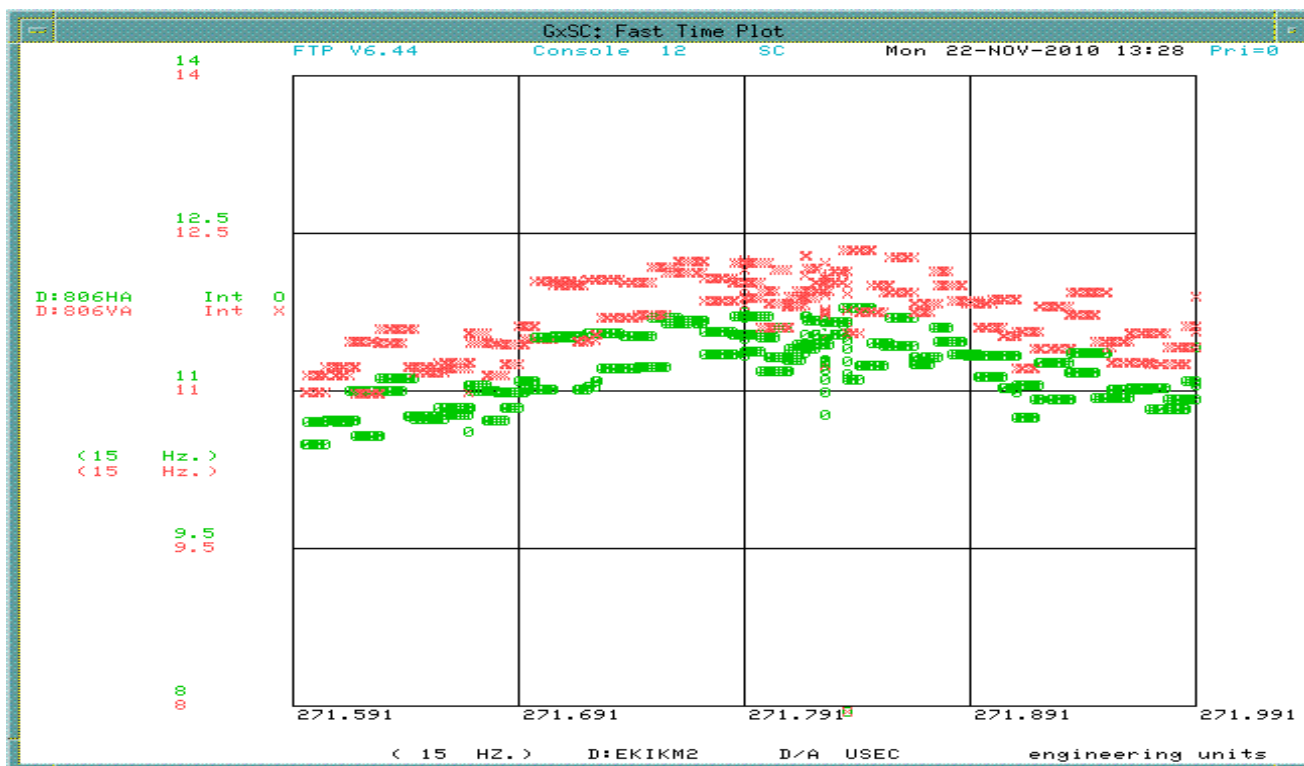
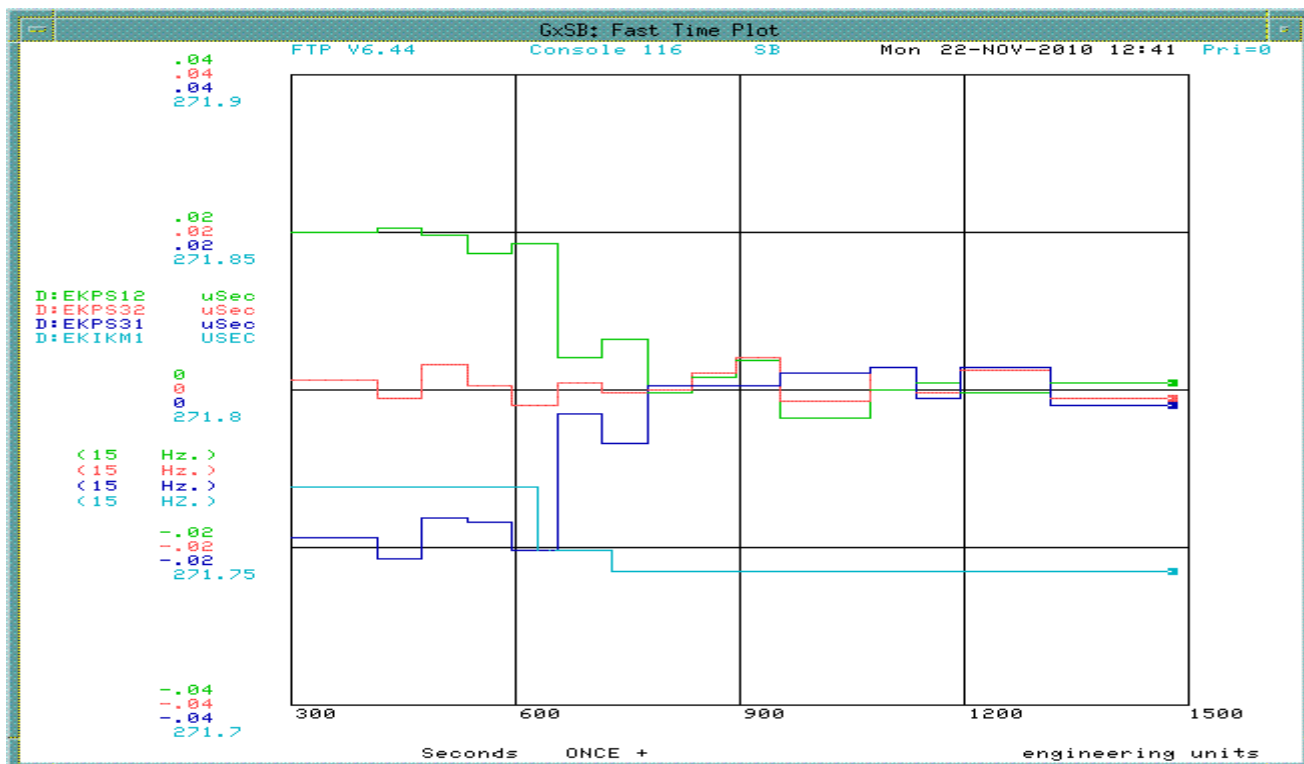




Maximized vertical emittance with master oscillator



This resulted in noisy and unpredictable behavior for the vertical emittance, so put it back.



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PA P60 POWER SUPPLY PARAM
P60 D:EKIK DAC Timing Params SET D/A A/D Com-U PTools
-<FTP>+ *SC* X-D/A X=D:EKIKM2 Y=D:806HA D:806VA A SPTW05 A SPPA06
COMMAND ...X Eng-U I= 271.591 I= 8 8 0 0
-<26>+ One+ AUTO F= 271.991 F= 14 14 40 10
acc10 acc30 acc50 deb10 deb30 deb50 protn inj DTOA ext bostr
! D:EKIK SCOPE PEAK POSITIONS
-D:EKPOS1 Deb Ext Ki .97640002 .97839999 .97839999 USEC
-D:EKPOS2 Deb Ext Ki .9752 .97439998 .97439998 USEC
-D:EKPOS3 Deb Ext Ki .97920001 .97680002 .97680002 USEC
D:EKIKSR D:EKIK Scope Reset
! Expert Parameters
-D:EKKTUNE D:EKIK Tune Up Needed 0 0 Valu
-D:EKALRM D:EKIK Max Kick Mod D 50 50 nSec
-D:EKAUTO D:EKIK Auto Tune Up Y 0 0 Valu

! Module Drift
-D:EKPS12 EKPS1 - E .0012 .004 .004 uSec
-D:EKPS13 EKPS1 - E -.0028 .0016 .0016 uSec
-D:EKPS32 EKPS3 - E .004 .0024 .0024 uSec
-D:EKPS21 EKPS12 * - -.0012 -.004 -.004 uSec
-D:EKPS31 EKPS13 * - .0028 -.0016 -.0016 uSec
-D:EKPS23 EKPS32 * - -.004 -.0024 -.0024 uSec

! Alignment Params (Be very careful here)
-D:EK1C3 D:EKIKM1 a 271.74481 271.7594 271.7594 uSec
-D:EK1C2 D:EKIKM1 a 271.74081 271.75699 271.75699 uSec
-D:EK2C1 D:EKIKM2 a 271.79221 271.814 271.814 uSec
-D:EK2C3 D:EKIKM2 a 271.79501 271.81241 271.81241 uSec
-D:EK3C1 D:EKIKM3 a 271.94321 271.96661 271.96661 uSec
-D:EK3C2 D:EKIKM3 a 271.94199 271.96259 271.96259 uSec

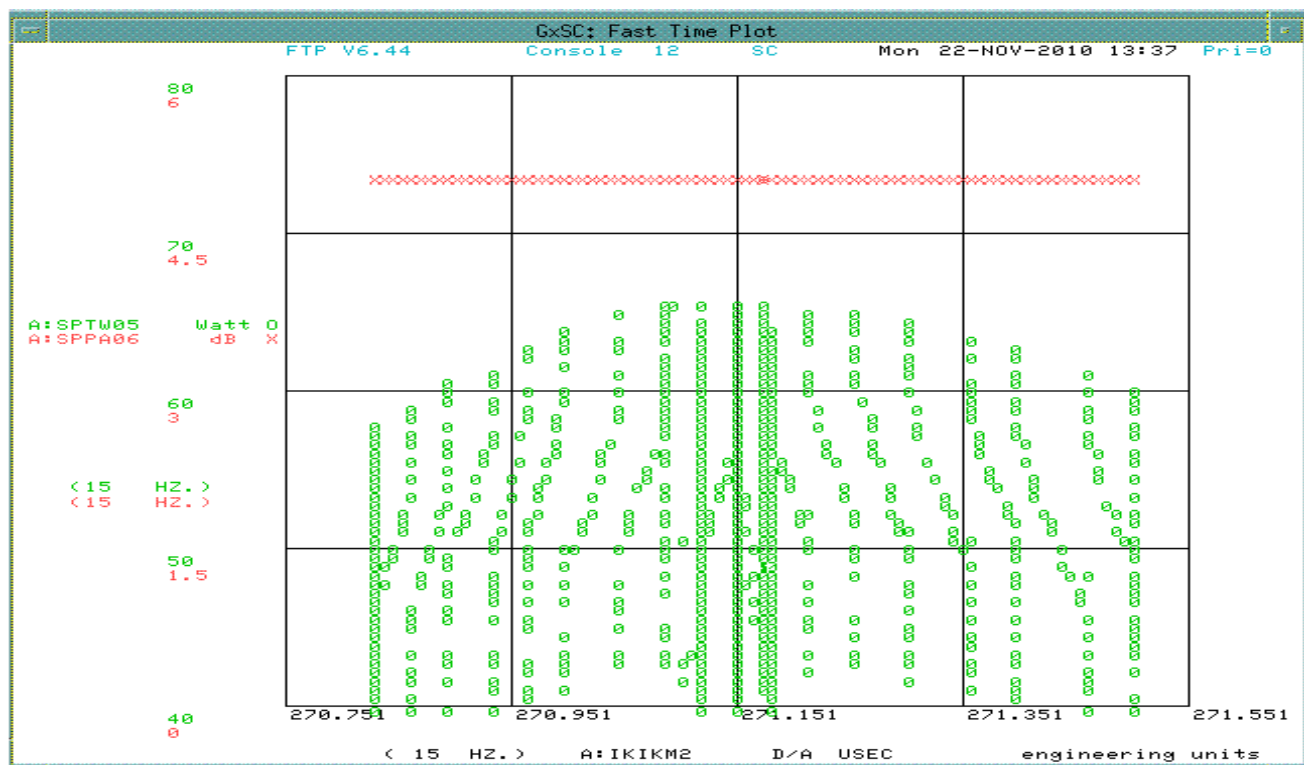
! Set Module #1 with Module #3 - D:EKIKM1=D:EK1C3
-D:EK1C3 D:EKIKM1 a 271.74481 271.7594 271.7594 uSec
-D:EKIKM1 DEB EXT KI 271.742 271.778 271.778 USEC ..

! Set Module #2 with Module #3 - D:EKIKM2=D:EK2C3
-D:EK2C3 D:EKIKM2 a 271.79501 271.81241 271.81241 uSec
-D:EKIKM2 DEB EXT KI 271.791 271.827 271.827 USEC ..

! Tune to maximize D/A Intensity
-D:806HA SEM806 Hor 0 11.417279 11.417279 Int

MULT :3
-D:EKIKM1*.1 DEB EXT KI 271.742 271.778 271.778 USEC ..
-D:EKIKM2*.1 DEB EXT KI 271.791 271.827 271.827 USEC ..
-D:EKIKM3*.1 DEB EXT KI 271.946 271.982 271.982 USEC ..
! D:IKIK DAC Parameters are on P60 INJ <23>
D:EKIKSR D:EKIK Scope Reset

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D/A Kicker alignment



| PA P60 POWER SUPPLY PARAM  |                                  |            |           |           |       |        |     |      |           |
|--|----------------------------------|------------|-----------|-----------|-------|--------|-----|------|-----------|
| P60  | D/A KICKER TIMING                | SET        | D/A       | A/D       | Com-U | PTools |     |      |           |
| <FTP>+ *SC+ X=D/A X=D:EKIKM2 Y=D:806HA ,D:806VA ,A SPTW05,A SPPA06 |                                  |            |           |           |       |        |     |      |           |
| COMMAND  | ...X Eng-U                       | I= 271.591 | I= 8      | 8         | 0     | 0      |     |      |           |
| < 3>+ One+ AUTO  | F= 271.991                       | F= 14      | 14        | 40        | 10    |        |     |      |           |
| acc10  | acc30                            | acc50      | deb10     | deb30     | deb50 | protn  | inj | DT0A | ext bostr |
| !D:EXTRAC SHOULD BE ON INPUT A FOR STACKING                        |                                  |            |           |           |       |        |     |      |           |
| -D:R2LLAM  | DRF2 LLRF AMPLITUDE              |            | 6         | 6.04      | VOLT  |        |     |      |           |
| D:EXTRAC   | D TO A TRANSFER CONTROL          |            | AH        |           |       |        |     |      |           |
| D:R2HLSC   | DRF2 Hi Lvl Stat/Cntrl           |            |           |           |       |        |     |      |           |
| MULT   | :6                               |            |           |           |       |        |     |      |           |
| -D:EKIKM1*.5   | DEB EXT KICKER MAIN C            | 271.778    | 271.778   | USEC      |       |        |     |      |           |
| -D:EKIKM2*.5   | DEB EXT KICKER MAIN C            | 271.827    | 271.827   | USEC      |       |        |     |      |           |
| -D:EKIKM3*.5   | DEB EXT KICKER MAIN C            | 271.982    | 271.982   | USEC      |       |        |     |      |           |
| -A:IKIKM1*.5   | ACC IN KIC                       | 271.157    | 271.181   | USEC      |       |        |     |      |           |
| -A:IKIKM2*.5   | ACC IN KIC                       | 271.151    | 271.175   | USEC      |       |        |     |      |           |
| -A:IKIKM3*.5   | ACC IN KIC                       | 270.933    | 270.957   | USEC      |       |        |     |      |           |
| -A:IBMINJ  | Stail mon inject be              | 14.52      | 13.55     | 13.55     | e07   |        |     |      |           |
| -A:SPPA06  | Stack Tail PIN Atten             | 5          | 5         | dB        | M     |        |     |      |           |
| MULT   | :3 A:IKIK TIMING                 |            |           |           |       |        |     |      |           |
| -A:IKIKM1*.5   | ACC IN KIC                       | 271.157    | 271.181   | USEC      |       |        |     |      |           |
| -A:IKIKM2*.5   | ACC IN KIC                       | 271.151    | 271.175   | USEC      |       |        |     |      |           |
| -A:IKIKM3*.5   | ACC IN KIC                       | 270.933    | 270.957   | USEC      |       |        |     |      |           |
| -D:ESEPC   | DEB EXT SEPT CHARGE T            | .2         | .2        | SECS      | -     |        |     |      |           |
| D:R2HLFB   | DRF2 Fanback Voltage             |            |           | 225.2     | Volt  |        |     |      |           |
| D:R2HLSC   | DRF2 Hi Lvl Stat/Cntrl           |            |           |           |       |        |     |      |           |
| MULT   | :3 D:EKIK TIMING                 |            |           |           |       |        |     |      |           |
| -D:EKIKM1*.1   | DEB EXT KICKER MAIN C            | 271.778    | 271.778   | USEC      |       |        |     |      |           |
| -D:EKIKM2*.1   | DEB EXT KICKER MAIN C            | 271.827    | 271.827   | USEC      |       |        |     |      |           |
| -D:EKIKM3*.1   | DEB EXT KICKER MAIN C            | 271.982    | 271.982   | USEC      |       |        |     |      |           |
| ! OAC POSITIONS ON D:EKIK SCOPE                                    |                                  |            |           |           |       |        |     |      |           |
| -D:EKPOS1  | Deb Ext Kick 1 OAC Ti            | .97719997  | .97719997 | USEC      |       |        |     |      |           |
| -D:EKPOS2  | Deb Ext Ki                       | .97839999  | .9756     | USEC      |       |        |     |      |           |
| -D:EKPOS3  | Deb Ext Ki                       | .97960001  | .98079997 | USEC      |       |        |     |      |           |
| ! MODULE DRIFT (SHOULD BE < +/- 0.04 USEC)                         |                                  |            |           |           |       |        |     |      |           |
| #D:EKPOS1-D:EKPOS2   |                                  |            | .00159997 | USEC      |       |        |     |      |           |
| #D:EKPOS1-D:EKPOS3   |                                  |            | -.0036    | USEC      |       |        |     |      |           |
| #D:EKPOS3-D:EKPOS2   |                                  |            | .00519997 | USEC      |       |        |     |      |           |
| !CALCULATED CORRECTIONS TO ALIGN WITH MOD#3 -271                   |                                  |            |           |           |       |        |     |      |           |
| #  | (D:EKIKM1+D:EKPOS3-D:EKPOS1)-271 |            |           | .78161621 | USEC  |        |     |      |           |
| #  | (D:EKIKM2+D:EKPOS3-D:EKPOS2)-271 |            |           | .83221436 | USEC  |        |     |      |           |
| -D:806HA   | SEM806 Hor                       | 11.793572  | 11.503952 | 11.503952 | Int   |        |     |      |           |
| -D:SA13T   | Trigger for D:SB13SA             | .55        | .55       | secs      |       |        |     |      |           |
| A:STCKRT   | Pbar Stacking Rate               |            |           | 21.56     | mA/h  |        |     |      |           |
| A:PRDCTN   | PBARS PER P @ TOR109             |            |           | 18.09     | E-6   |        |     |      |           |